

Package ‘asa’

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Title AI Search Agent for Large-Scale Research Automation

Version 0.1.0

Description Provides an LLM-powered research agent for performing AI search tasks at large scales. Uses a ReAct (Reasoning + Acting) agent pattern with web search capabilities via DuckDuckGo and Wikipedia. Implements DeepAgent-style memory folding for context management. The agent is built on 'LangGraph' and supports multiple LLM backends including 'OpenAI', 'Groq', and 'xAI'.

URL <https://github.com/cjerzak/asa-software>

BugReports <https://github.com/cjerzak/asa-software/issues>

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asa-package	<i>asa: AI Search Agent for Large-Scale Research Automation</i>
-------------	---

Description

The asa package provides an LLM-powered research agent for performing AI search tasks at large scales using web search capabilities.

The agent uses a ReAct (Reasoning + Acting) pattern implemented via LangGraph, with tools for searching DuckDuckGo and Wikipedia. It supports multiple LLM backends (OpenAI, Groq, xAI) and implements DeepAgent-style memory folding for managing long conversations.

Main Functions

- [build_backend](#): Set up the Python conda environment
- [initialize_agent](#): Initialize the search agent
- [run_agent](#): Run the agent with a custom prompt
- [run_task](#): Run a structured task with the agent
- [run_task_batch](#): Run multiple tasks in batch

Configuration

The package requires a Python environment with LangChain and related packages. Use [build_backend](#) to create this environment automatically.

For anonymous searching, the package can use Tor as a SOCKS5 proxy. Install Tor via brew `install tor` (macOS) and start it with `brew services start tor`.

Author(s)

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See Also

- Useful links:
- <https://github.com/cjerzak/asa-software>
 - Report bugs at <https://github.com/cjerzak/asa-software/issues>

<code>.build_trace</code>	<i>Build Trace from Raw Response</i>
---------------------------	--------------------------------------

Description

Build Trace from Raw Response

Usage

```
.build_trace(raw_response)
```

<code>.close_http_clients</code>	<i>Close HTTP Clients</i>
----------------------------------	---------------------------

Description

Safely closes the synchronous httpx client to prevent resource leaks. This is called automatically by `reset_agent()` and when reinitializing.

Usage

```
.close_http_clients()
```

Details

Note: We no longer create or manage async clients from R (R-CRIT-001 fix). LangChain manages its own async client lifecycle internally.

Value

Invisibly returns NULL

<code>.create_agent</code>	<i>Create the LangGraph Agent</i>
----------------------------	-----------------------------------

Description

Create the LangGraph Agent

Usage

```
.create_agent(
  llm,
  tools,
  use_memory_folding,
  memory_threshold,
  memory_keep_recent
)
```

Arguments

<code>llm</code>	LLM instance
<code>tools</code>	List of tools
<code>use_memory_folding</code>	Whether to use memory folding
<code>memory_threshold</code>	Messages before folding
<code>memory_keep_recent</code>	Messages to keep

`.create_http_clients` *Create HTTP Client for API Calls*

Description

Creates a synchronous httpx client for LLM API calls. Note: We intentionally do NOT create an async client. LangChain/OpenAI SDK creates its own async client internally when needed (for async operations). This avoids R-CRIT-001 where async client cleanup was unreliable from R since `aclose()` requires an async context.

Usage

```
.create_http_clients(proxy, timeout)
```

Arguments

<code>proxy</code>	Proxy URL or NULL
<code>timeout</code>	Timeout in seconds

Value

A list with 'sync' client (async is NULL, letting LangChain manage it)

`.create_llm` *Create LLM Instance*

Description

Create LLM Instance

Usage

```
.create_llm(backend, model, clients, rate_limit)
```

Arguments

<code>backend</code>	Backend name
<code>model</code>	Model identifier
<code>clients</code>	HTTP clients (for OpenAI)
<code>rate_limit</code>	Requests per second

<hr/>	
.create_tools	Create Search Tools
<hr/>	
Description	
Create Search Tools	
Usage	
.create_tools(proxy)	
Arguments	
proxy	Proxy URL or NULL
<hr/>	
.extract_fields	Extract Specific Fields from Response
<hr/>	
Description	
Extract Specific Fields from Response	
Usage	
.extract_fields(text, fields)	
Arguments	
text	Response text
fields	Character vector of field names to extract
<hr/>	
.extract_json_from_trace	Extract JSON from Agent Traces
<hr/>	
Description	
Internal function to extract JSON data from raw agent traces.	
Usage	
.extract_json_from_trace(text)	
Arguments	
text	Raw trace text
Value	
Parsed JSON data as a list, or NULL if no JSON found	

.extract_json_object *Extract JSON Object from Text*

Description

Extract JSON Object from Text

Usage

```
.extract_json_object(text)
```

Arguments

text	Response text
------	---------------

.extract_response_text
 Extract Response Text from Raw Response

Description

Extract Response Text from Raw Response

Usage

```
.extract_response_text(raw_response, backend)
```

.get_extdata_path *Get External Data Path*

Description

Returns the path to the package's external data directory.

Usage

```
.get_extdata_path(filename = NULL)
```

Arguments

filename	Optional filename within extdata directory
----------	--

Value

Character string with the path

<code>.get_local_ip</code>	<i>Get Local IP Address (Cross-Platform)</i>
----------------------------	--

Description

Returns the local IP address for use with Exo backend. Works on Windows, macOS, and Linux.

Usage

```
.get_local_ip()
```

Value

Character string with the local IP address, or "127.0.0.1" on failure.

<code>.get_python_path</code>	<i>Get Package Python Module Path</i>
-------------------------------	---------------------------------------

Description

Returns the path to the Python modules shipped with the package.

Usage

```
.get_python_path()
```

Value

Character string with the path to inst/python

<code>.handle_response_issues</code>	<i>Handle Response Issues (Rate Limiting, Timeouts)</i>
--------------------------------------	---

Description

Handle Response Issues (Rate Limiting, Timeouts)

Usage

```
.handle_response_issues(trace, verbose)
```

`.import_python_packages`

Import Required Python Packages

Description

Import Required Python Packages

Usage

`.import_python_packages()`

`.invoke_memory_folding_agent`

Invoke Memory Folding Agent

Description

Invoke Memory Folding Agent

Usage

`.invoke_memory_folding_agent(python_agent, prompt, recursion_limit)`

`.invoke_standard_agent`

Invoke Standard Agent

Description

Invoke Standard Agent

Usage

`.invoke_standard_agent(python_agent, prompt, recursion_limit)`

`.is_initialized`

Check if ASA Agent is Initialized

Description

Check if ASA Agent is Initialized

Usage

`.is_initialized()`

Value

Logical indicating if the agent has been initialized

.parse_json_response	<i>Parse JSON Response</i>
----------------------	----------------------------

Description

Parse JSON Response

Usage

```
.parse_json_response(response_text)
```

Arguments

response_text	Response text from agent
---------------	--------------------------

as.data.frame.asa_result	<i>Convert asa_result to Data Frame</i>
--------------------------	---

Description

Convert asa_result to Data Frame

Usage

```
## S3 method for class 'asa_result'  
as.data.frame(x, ...)
```

Arguments

x	An asa_result object
...	Additional arguments (ignored)

Value

A single-row data frame

asa_agent	<i>Constructor for asa_agent Objects</i>
-----------	--

Description

Creates an S3 object representing an initialized ASA search agent.

Usage

```
asa_agent(python_agent, backend, model, config)
```

Arguments

python_agent	The underlying Python agent object
backend	LLM backend name (e.g., "openai", "groq")
model	Model identifier
config	Agent configuration list

Value

An object of class `asa_agent`

asa_response	<i>Constructor for asa_response Objects</i>
--------------	---

Description

Creates an S3 object representing an agent response.

Usage

```
asa_response(  
    message,  
    status_code,  
    raw_response,  
    trace,  
    elapsed_time,  
    fold_count,  
    prompt  
)
```

Arguments

message	The final response text
status_code	Status code (200 = success, 100 = error)
raw_response	The full Python response object
trace	Full text trace of agent execution
elapsed_time	Execution time in minutes
fold_count	Number of memory folds performed
prompt	The original prompt

Value

An object of class `asa_response`

<code>asa_result</code>	<i>Constructor for <code>asa_result</code> Objects</i>
-------------------------	--

Description

Creates an S3 object representing the result of a research task.

Usage

```
asa_result(prompt, message, parsed, raw_output, elapsed_time, status)
```

Arguments

<code>prompt</code>	The original prompt
<code>message</code>	The agent's response text
<code>parsed</code>	Parsed output (list or NULL)
<code>raw_output</code>	Full agent trace
<code>elapsed_time</code>	Execution time in minutes
<code>status</code>	Status ("success" or "error")

Value

An object of class `asa_result`

<code>build_backend</code>	<i>Build the Python Backend Environment</i>
----------------------------	---

Description

Creates a conda environment with all required Python dependencies for the `asa` search agent, including `LangChain`, `LangGraph`, and search tools.

Usage

```
build_backend(conda_env = "asa_env", conda = "auto", python_version = "3.13")
```

Arguments

<code>conda_env</code>	Name of the conda environment (default: "asa_env")
<code>conda</code>	Path to conda executable (default: "auto")
<code>python_version</code>	Python version to use (default: "3.13")

Details

This function creates a new conda environment and installs the following Python packages:

- langchain_groq, langchain_community, langchain_openai
- langgraph
- ddgs (DuckDuckGo search)
- selenium, primp (browser automation)
- beautifulsoup4, requests
- fake_headers, httpx
- pysocks, socksio (proxy support)

Value

Invisibly returns NULL; called for side effects.

Examples

```
## Not run:
# Create the default environment
build_backend()

# Create with a custom name
build_backend(conda_env = "my_asa_env")

## End(Not run)
```

build_prompt

Build a Task Prompt from Template

Description

Creates a formatted prompt by substituting variables into a template.

Usage

```
build_prompt(template, ...)
```

Arguments

template	A character string with placeholders in the form {variable_name}
...	Named arguments to substitute into the template

Value

A formatted prompt string

Examples

```
## Not run:
prompt <- build_prompt(
  template = "Find information about {{name}} in {{country}} during {{year}}",
  name = "Marie Curie",
  country = "France",
  year = 1903
)

## End(Not run)
```

check_backend

*Check Python Environment Availability***Description**

Checks if the required Python environment and packages are available.

Usage

```
check_backend(conda_env = "asa_env")
```

Arguments

conda_env Name of the conda environment to check

Value

A list with components:

- available: Logical, TRUE if environment is ready
- conda_env: Name of the environment checked
- python_version: Python version if available
- missing_packages: Character vector of missing packages (if any)

Examples

```
## Not run:
status <- check_backend()
if (!status$available) {
  build_backend()
}

## End(Not run)
```

clean_whitespace	<i>Clean Whitespace</i>
------------------	-------------------------

Description

Normalizes whitespace in a string by collapsing multiple spaces and trimming leading/trailing whitespace.

Usage

```
clean_whitespace(x)
```

Arguments

x	Character string
---	------------------

Value

Cleaned string

configure_search	<i>Configure Python Search Parameters</i>
------------------	---

Description

Sets global configuration values for the Python search module. These values control timeouts, retry behavior, and result limits.

Usage

```
configure_search(  
    max_results = NULL,  
    timeout = NULL,  
    max_retries = NULL,  
    retry_delay = NULL,  
    backoff_multiplier = NULL,  
    captcha_backoff_base = NULL,  
    page_load_wait = NULL,  
    inter_search_delay = NULL,  
    conda_env = "asa_env"  
)
```

Arguments

max_results	Maximum number of search results to return (default: 10)
timeout	HTTP request timeout in seconds (default: 15)
max_retries	Maximum retry attempts on failure (default: 3)
retry_delay	Initial delay between retries in seconds (default: 2)

backoff_multiplier	Multiplier for exponential backoff (default: 1.5)
captcha_backoff_base	Base multiplier for CAPTCHA backoff (default: 3)
page_load_wait	Wait time after page load in seconds (default: 2)
inter_search_delay	Delay between consecutive searches in seconds (default: 0.5)
conda_env	Name of the conda environment (default: "asa_env")

Value

Invisibly returns a list with the current configuration

Examples

```
## Not run:
# Increase timeout for slow connections
configure_search(timeout = 30, max_retries = 5)

# Get more results
configure_search(max_results = 20)

# Add delay between searches to avoid rate limiting
configure_search(inter_search_delay = 2.0)

## End(Not run)
```

configure_search_logging

Configure Python Search Logging Level

Description

Sets the logging level for the Python search module. This controls how much diagnostic output is produced during web searches.

Usage

```
configure_search_logging(level = "WARNING", conda_env = "asa_env")
```

Arguments

level	Log level: "DEBUG", "INFO", "WARNING" (default), "ERROR", or "CRITICAL"
conda_env	Name of the conda environment (default: "asa_env")

Details

Log levels from most to least verbose:

- **DEBUG:** Detailed diagnostic information for debugging
- **INFO:** General operational information
- **WARNING:** Indicates something unexpected but not an error (default)
- **ERROR:** Serious problems that prevented an operation
- **CRITICAL:** Very serious errors

Value

Invisibly returns the current logging level

Examples

```
## Not run:
# Enable verbose debugging output
configure_search_logging("DEBUG")

# Run a search (will show detailed logs)
result <- run_task("What is the population of Tokyo?", agent = agent)

# Disable verbose output
configure_search_logging("WARNING")

## End(Not run)
```

`decode_html`*Decode HTML Entities*

Description

Converts HTML entities to their character equivalents.

Usage

```
decode_html(x)
```

Arguments

`x` Character string with HTML entities

Value

Decoded string

extract_agent_results *Extract Structured Data from Agent Traces*

Description

Parses raw agent output to extract search snippets, Wikipedia content, URLs, JSON data, and search tier information. This is the main function for post-processing agent traces.

Usage

```
extract_agent_results(raw_output)
```

Arguments

raw_output	Raw output string from agent invocation (the trace field from an asa_response object)
------------	---

Value

A list with components:

- search_snippets: Character vector of search result content
- search_urls: Character vector of URLs from search results
- wikipedia_snippets: Character vector of Wikipedia content
- json_data: Extracted JSON data as a list (if present)
- search_tiers: Character vector of unique search tiers used (e.g., "primp", "selenium", "ddgs", "requests")

Examples

```
## Not run:
response <- run_agent("Who is the president of France?", agent)
extracted <- extract_agent_results(response$trace)
print(extracted$search_snippets)
print(extracted$search_tiers) # Shows which search tier was used

## End(Not run)
```

extract_search_snippets

Extract Search Snippets by Source Number

Description

Extracts content from Search tool messages in the agent trace.

Usage

```
extract_search_snippets(text)
```

Arguments

text Raw agent trace text

Value

Character vector of search snippets, ordered by source number

Examples

```
## Not run:
snippets <- extract_search_snippets(response$trace)

## End(Not run)
```

extract_search_tiers *Extract Search Tier Information*

Description

Extracts which search tier was used from the agent trace. The search module uses a multi-tier fallback system:

- primp: Fast HTTP client with browser impersonation (Tier 0)
- selenium: Headless browser for JS-rendered content (Tier 1)
- ddgs: Standard DDGS Python library (Tier 2)
- requests: Raw POST to DuckDuckGo HTML endpoint (Tier 3)

Usage

```
extract_search_tiers(text)
```

Arguments

text Raw agent trace text

Value

Character vector of unique tier names encountered (e.g., "primp", "selenium", "ddgs", "requests")

Examples

```
## Not run:
tiers <- extract_search_tiers(response$trace)
print(tiers) # e.g., "primp"

## End(Not run)
```

extract_urls	<i>Extract URLs by Source Number</i>
--------------	--------------------------------------

Description

Extracts URLs from Search tool messages in the agent trace.

Usage

```
extract_urls(text)
```

Arguments

text	Raw agent trace text
------	----------------------

Value

Character vector of URLs, ordered by source number

Examples

```
## Not run:  
urls <- extract_urls(response$trace)  
  
## End(Not run)
```

extract_wikipedia_content	<i>Extract Wikipedia Content</i>
---------------------------	----------------------------------

Description

Extracts content from Wikipedia tool messages in the agent trace.

Usage

```
extract_wikipedia_content(text)
```

Arguments

text	Raw agent trace text
------	----------------------

Value

Character vector of Wikipedia snippets

Examples

```
## Not run:
wiki <- extract_wikipedia_content(response$trace)

## End(Not run)
```

format_duration	<i>Format Time Duration</i>
-----------------	-----------------------------

Description

Formats a numeric duration (in minutes) as a human-readable string.

Usage

```
format_duration(minutes)
```

Arguments

minutes	Numeric duration in minutes
---------	-----------------------------

Value

Formatted string

get_agent	<i>Get the Current Agent</i>
-----------	------------------------------

Description

Returns the currently initialized agent, or NULL if not initialized.

Usage

```
get_agent()
```

Value

An asa_agent object or NULL

Examples

```
## Not run:
agent <- get_agent()
if (is.null(agent)) {
  agent <- initialize_agent()
}

## End(Not run)
```

get_tor_ip	<i>Get External IP via Tor</i>
------------	--------------------------------

Description

Retrieves the external IP address as seen through Tor proxy.

Usage

```
get_tor_ip(proxy = "socks5h://127.0.0.1:9050")
```

Arguments

proxy	Tor proxy URL
-------	---------------

Value

IP address string or NA on failure

Examples

```
## Not run:
ip <- get_tor_ip()
message("Current Tor IP: ", ip)

## End(Not run)
```

initialize_agent	<i>Initialize the ASA Search Agent</i>
------------------	--

Description

Initializes the Python environment and creates the LangGraph agent with search tools (Wikipedia, DuckDuckGo). The agent can use multiple LLM backends and supports DeepAgent-style memory folding.

Usage

```
initialize_agent(
  backend = "openai",
  model = "gpt-4.1-mini",
  conda_env = "asa_env",
  proxy = "socks5h://127.0.0.1:9050",
  use_memory_folding = TRUE,
  memory_threshold = 4L,
  memory_keep_recent = 2L,
  rate_limit = 0.2,
  timeout = 120L,
  verbose = TRUE
)
```

Arguments

backend	LLM backend to use. One of: "openai", "groq", "xai", "exo", "openrouter"
model	Model identifier (e.g., "gpt-4.1-mini", "llama-3.3-70b-versatile")
conda_env	Name of the conda environment with Python dependencies
proxy	SOCKS5 proxy URL for Tor (default: "socks5h://127.0.0.1:9050"). Set to NULL to disable proxy.
use_memory_folding	Enable DeepAgent-style memory compression (default: TRUE)
memory_threshold	Number of messages before folding triggers (default: 4)
memory_keep_recent	Number of recent messages to preserve after folding (default: 2)
rate_limit	Requests per second for rate limiting (default: 0.2)
timeout	Request timeout in seconds (default: 120)
verbose	Print status messages (default: TRUE)

Details

The agent is created with two tools:

- Wikipedia: For looking up encyclopedic information
- DuckDuckGo Search: For web searches with a 4-tier fallback system (PRIMP -> Selenium -> DDGS library -> raw requests)

Memory folding (enabled by default) compresses older messages into a summary to manage context length in long conversations, following the DeepAgent paper.

Value

An object of class `asa_agent` containing the initialized agent and configuration.

API Keys

The following environment variables should be set based on your backend:

- OpenAI: OPENAI_API_KEY
- Groq: GROQ_API_KEY
- xAI: XAI_API_KEY
- OpenRouter: OPENROUTER_API_KEY

OpenRouter Models

When using the "openrouter" backend, model names must be in provider/model-name format. Examples:

- "openai/gpt-4o"
- "anthropic/claude-3-sonnet"
- "google/gemma-2-9b-it:free"
- "meta-llama/llama-3-70b-instruct"

See <https://openrouter.ai/models> for available models.

See Also

[run_agent](#), [run_task](#)

Examples

```
## Not run:
# Initialize with OpenAI
agent <- initialize_agent(
  backend = "openai",
  model = "gpt-4.1-mini"
)

# Initialize with Groq and custom settings
agent <- initialize_agent(
  backend = "groq",
  model = "llama-3.3-70b-versatile",
  use_memory_folding = FALSE,
  proxy = NULL # No Tor proxy
)

# Initialize with OpenRouter (access to 100+ models)
agent <- initialize_agent(
  backend = "openrouter",
  model = "anthropic/claude-3-sonnet" # Note: provider/model format
)

## End(Not run)
```

is_tor_running	<i>Check if Tor is Running</i>
----------------	--------------------------------

Description

Checks if Tor is running and accessible on the default port.

Usage

```
is_tor_running(port = 9050L)
```

Arguments

port	Port number (default: 9050)
------	-----------------------------

Value

Logical indicating if Tor appears to be running

Examples

```
## Not run:
if (!is_tor_running()) {
  message("Start Tor with: brew services start tor")
}

## End(Not run)
```

`json_escape`*Clean Text for JSON Output*

Description

Escapes special characters in text for safe inclusion in JSON strings.

Usage

```
json_escape(x)
```

Arguments

<code>x</code>	Character string to escape
----------------	----------------------------

Value

Escaped string

`print.asa_agent`*Print Method for asa_agent Objects*

Description

Print Method for asa_agent Objects

Usage

```
## S3 method for class 'asa_agent'
print(x, ...)
```

Arguments

<code>x</code>	An asa_agent object
<code>...</code>	Additional arguments (ignored)

Value

Invisibly returns the object

print.asa_response	<i>Print Method for asa_response Objects</i>
--------------------	--

Description

Print Method for asa_response Objects

Usage

```
## S3 method for class 'asa_response'  
print(x, ...)
```

Arguments

x	An asa_response object
...	Additional arguments (ignored)

Value

Invisibly returns the object

print.asa_result	<i>Print Method for asa_result Objects</i>
------------------	--

Description

Print Method for asa_result Objects

Usage

```
## S3 method for class 'asa_result'  
print(x, ...)
```

Arguments

x	An asa_result object
...	Additional arguments (ignored)

Value

Invisibly returns the object

print2	<i>Print Utility</i>
--------	----------------------

Description

Wrapper around cat for consistent output formatting.

Usage

```
print2(...)
```

Arguments

...	Arguments passed to cat
-----	-------------------------

process_outputs	<i>Process Multiple Agent Outputs</i>
-----------------	---------------------------------------

Description

Processes a data frame of raw agent outputs, extracting structured data.

Usage

```
process_outputs(df, parallel = FALSE, workers = 10L)
```

Arguments

df	Data frame with a 'raw_output' column containing agent traces
parallel	Use parallel processing
workers	Number of workers

Value

The input data frame with additional extracted columns: search_count, wiki_count, and any JSON fields found

reset_agent	<i>Reset the Agent</i>
-------------	------------------------

Description

Clears the initialized agent state, forcing reinitialization on next use. Also closes any open HTTP clients to prevent resource leaks.

Usage

```
reset_agent()
```

Value

Invisibly returns NULL

rotate_tor_circuit	<i>Rotate Tor Circuit</i>
--------------------	---------------------------

Description

Requests a new Tor circuit by restarting the Tor service.

Usage

```
rotate_tor_circuit(method = c("brew", "systemctl", "signal"), wait = 12L)
```

Arguments

method	Method to restart: "brew" (macOS), "systemctl" (Linux), or "signal"
wait	Seconds to wait for new circuit (default: 12)

Value

Invisibly returns NULL

Examples

```
## Not run:  
rotate_tor_circuit()  
  
## End(Not run)
```

run_agent

*Run the ASA Agent with a Custom Prompt***Description**

Invokes the search agent with an arbitrary prompt, returning the full agent trace and response. This is the low-level function for running the agent; for structured task execution, use [run_task](#).

Usage

```
run_agent(prompt, agent = NULL, recursion_limit = NULL, verbose = FALSE)
```

Arguments

prompt	The prompt to send to the agent
agent	An <code>asa_agent</code> object from initialize_agent , or <code>NULL</code> to use/create the default agent
recursion_limit	Maximum number of agent steps (default: 100 for memory folding, 20 otherwise)
verbose	Print status messages (default: <code>FALSE</code>)

Value

An object of class `asa_response` containing:

- `message`: The final response text
- `status_code`: 200 for success, 100 for error
- `raw_response`: The full Python response object
- `trace`: Full text trace of agent execution
- `elapsed_time`: Execution time in minutes
- `fold_count`: Number of memory folds (if memory folding enabled)

See Also

[initialize_agent](#), [run_task](#)

Examples

```
## Not run:
# Run with a custom prompt
agent <- initialize_agent()
result <- run_agent(
  prompt = "Who was the 44th president of the United States?",
  agent = agent
)
print(result$message)

## End(Not run)
```

run_agent_batch	<i>Run Agent in Batch Mode</i>
-----------------	--------------------------------

Description

Runs the agent on multiple prompts, optionally in parallel.

Usage

```
run_agent_batch(  
  prompts,  
  agent = NULL,  
  parallel = FALSE,  
  workers = 4L,  
  progress = TRUE  
)
```

Arguments

prompts	Character vector of prompts
agent	An asa_agent object
parallel	Use parallel processing (requires future.apply package)
workers	Number of parallel workers (default: 4)
progress	Show progress bar (default: TRUE)

Value

A list of asa_response objects

Examples

```
## Not run:  
prompts <- c(  
  "What is the population of Tokyo?",  
  "What is the population of New York?"  
)  
results <- run_agent_batch(prompts, agent)  
  
## End(Not run)
```

`run_task`*Run a Structured Task with the Agent*

Description

Executes a research task using the AI search agent with a structured prompt and returns parsed results.

Usage

```
run_task(prompt, output_format = "text", agent = NULL, verbose = FALSE)
```

Arguments

<code>prompt</code>	The task prompt or question for the agent to research
<code>output_format</code>	Expected output format. One of: "text" (raw response), "json" (parse as JSON), or a character vector of field names to extract
<code>agent</code>	An <code>asa_agent</code> object from initialize_agent , or <code>NULL</code> to use the currently initialized agent
<code>verbose</code>	Print progress messages (default: <code>FALSE</code>)

Details

This function provides a high-level interface for running research tasks. For simple text responses, use `output_format = "text"`. For structured outputs, use `output_format = "json"` or specify field names to extract.

Value

An object of class `asa_result` with components:

- `prompt`: The original prompt
- `message`: The agent's response text
- `parsed`: Parsed output (if `output_format` specified)
- `raw_output`: Full agent trace
- `elapsed_time`: Execution time in minutes
- `status`: "success" or "error"

See Also

[initialize_agent](#), [run_agent](#), [run_task_batch](#)

Examples

```
## Not run:
# Initialize agent first
agent <- initialize_agent(backend = "openai", model = "gpt-4.1-mini")

# Simple text query
result <- run_task(
  prompt = "What is the capital of France?",
  output_format = "text",
  agent = agent
)
print(result$message)

# JSON structured output
result <- run_task(
  prompt = "Find information about Albert Einstein and return JSON with
           fields: birth_year, death_year, nationality, field_of_study",
  output_format = "json",
  agent = agent
)
print(result$parsed)

## End(Not run)
```

run_task_batch

Run Multiple Tasks in Batch

Description

Executes multiple research tasks, optionally in parallel.

Usage

```
run_task_batch(
  prompts,
  output_format = "text",
  agent = NULL,
  parallel = FALSE,
  workers = 4L,
  progress = TRUE
)
```

Arguments

prompts	Character vector of task prompts, or a data frame with a 'prompt' column
output_format	Expected output format (applies to all tasks)
agent	An <code>asa_agent</code> object
parallel	Use parallel processing
workers	Number of parallel workers
progress	Show progress messages

Value

A list of `asa_result` objects, or if `prompts` was a data frame, the data frame with result columns added

Examples

```
## Not run:
prompts <- c(
  "What is the population of Tokyo?",
  "What is the population of New York?",
  "What is the population of London?"
)
results <- run_task_batch(prompts, agent = agent)

## End(Not run)
```

safe_json_parse	<i>Safe JSON Parse</i>
-----------------	------------------------

Description

Attempts to parse JSON, returning NULL on failure.

Usage

```
safe_json_parse(x)
```

Arguments

x JSON string

Value

Parsed R object or NULL

summary.asa_agent	<i>Summary Method for asa_agent Objects</i>
-------------------	---

Description

Summary Method for `asa_agent` Objects

Usage

```
## S3 method for class 'asa_agent'
summary(object, ...)
```

Arguments

object	An asa_agent object
...	Additional arguments (ignored)

Value

Invisibly returns a summary list

summary.asa_response	<i>Summary Method for asa_response Objects</i>
----------------------	--

Description

Summary Method for asa_response Objects

Usage

```
## S3 method for class 'asa_response'
summary(object, show_trace = FALSE, ...)
```

Arguments

object	An asa_response object
show_trace	Include full trace in output
...	Additional arguments (ignored)

Value

Invisibly returns a summary list

summary.asa_result	<i>Summary Method for asa_result Objects</i>
--------------------	--

Description

Summary Method for asa_result Objects

Usage

```
## S3 method for class 'asa_result'
summary(object, ...)
```

Arguments

object	An asa_result object
...	Additional arguments (ignored)

Value

Invisibly returns a summary list

truncate_string	<i>Truncate String</i>
-----------------	------------------------

Description

Truncates a string to a maximum length, adding ellipsis if truncated.

Usage

```
truncate_string(x, max_length = 100, ellipsis = "...")
```

Arguments

x	Character string
max_length	Maximum length
ellipsis	String to append when truncated

Value

Truncated string

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